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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/723,762	11/26/2003	William J. Swanson	S697.12-0023	9705

164 7590 12/29/2006
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EXAMINER	
DANIELS, MATTHEW J	
ART UNIT	**PAPER NUMBER**
1732	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	12/29/2006	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)
	10/723,762	SWANSON ET AL.
	Examiner	Art Unit
	Matthew J. Daniels	1732

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 October 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 15 August 2006 has been entered.

Claim Objections

2. **Claim 1** is objected to because of the following informalities: The claim is ended by a semicolon instead of a period. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. **Claims 1-6, 8-12, 14-18, and 20** are rejected under 35 U.S.C. 103(a) as obvious over Penn (USPN 5260009) in view of Gore (USPN 5257657). **As to Claim 1**, Penn teaches a method for three-dimensional modeling (entire document) comprising the steps of heating a build chamber to an elevated temperature (7:50-55), dispensing modeling material from an outlet of a dispensing head onto a base, and moving the dispensing head and the base in three-

dimensions with respect to one another in synchrony with the dispensing of modeling material so as to build up a three dimensional object of predetermined shape on the base (6:54-68, 8:35-46), characterized by:

maintaining physical and thermal separation between the heated build chamber and a gantry that controls motion of the dispensing head with at least a first deformable thermal insulator and a second deformable thermal insulator (see item 45 in fig. 1a and other deformable insulators);

compressing or expanding the first deformable thermal insulator when the dispensing head is moved in a first direction (see arrows above and below "45" in fig. 1a);

compressing or expanding the second deformable insulator when the dispensing head is moved in a second direction that is orthogonal to the first direction (see arrows above and below "45" in fig. 1a).

Penn appears to be silent to a base provided in the build chamber. However, Gore teaches a base provided "in" the build chamber (Fig. 1, items 28 and 22). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Gore into that of Penn because (1) Penn suggests an environmentally-controlled chamber and Gore provides such a chamber, and (2) Gore teaches that the mass of the substrate is important and should be monitored to provide optimum solidification (6:7-20). **As to Claim 2**, Penn teaches that the gantry can control the motion of any component, including the base (6:54-68). **As to Claim 3**, in view of the compressible bellows surrounding each motion controller in the method of Penn, the Examiner asserts that it would have been obvious to maintain physical and thermal separation between the build chamber and the lift (6:60-63

describes movement of the base). **As to Claim 4**, Gore teaches that either the layered material or the lower bead can be heated and controlled within well-defined temperature ranges to avoid weak bond formation (5:10-24). Gore additionally teaches that the equilibrium temperature is preferably only slightly below the solidification temperature of the liquid-phase material for objects that are built up rapidly (6:42-45). Because Gore additionally teaches depositing tin (6:65), which melts at approximately 232 degrees C, it would have been obvious to one practicing the combined method that in order to deposit tin, a build chamber temperature greater than 200 degrees C would be needed in order to provide an equilibrium temperature only slightly below the solidification temperature in order to maximize the build speed (6:42-45). Additionally, Gore teaches (5:10-24) that the temperature of the layered materials, and therefore the chamber that contains them, represents a result-effective variable that can be optimized. See MPEP 2144.05 II and *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). **As to Claim 5**, Penn moves all components in all directions (6:54-68). **As to Claim 6**, Penn provides a modeling feedstock to an inlet located external to the build chamber (see tubes coming out of item 40 in Fig. 1a).

As to Claim 8, Penn teaches a method for three-dimensional modeling (entire document) comprising the steps of heating a build chamber to an elevated temperature (7:50-55), dispensing modeling material from an outlet of a dispensing head onto a base, and moving the dispensing head and the base in three-dimensions with respect to one another in synchrony with the dispensing of modeling material so as to build up a three dimensional object of predetermined shape on the base (6:54-68, 8:35-46):

Controlling the motion of the dispensing head and the base with motion control components located external to the build chamber, the motion control components comprising at least one rail that defines an axis of movement for the dispensing head (Fig. 1a, item 45);

maintaining thermal isolation between the external motion control components and the build chamber with at least a first deformable thermal insulator and a second deformable thermal insulator (see deformable thermal insulators on the rails in Fig. 1a);

compressing or expanding the first deformable thermal insulator when the dispensing head is moved in a first direction (see arrows above and below "45" in fig. 1a);

compressing or expanding the second deformable insulator when the dispensing head is moved in a second direction that is orthogonal to the first direction (see arrows above and below "45" in fig. 1a).

Penn appears to be silent to a base provided <u>in</u> the build chamber. However, Gore teaches a base provided "in" the build chamber (Fig. 1, items 28 and 22). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Gore into that of Penn because (1) Penn suggests an environmentally-controlled chamber and Gore provides such a chamber, and (2) Gore teaches that the mass of the substrate is important and should be monitored to provide optimum solidification (6:7-20). **As to Claims 9 and 10**, Gore teaches that either the layered material or the lower bead can be heated and controlled within well-defined temperature ranges to avoid weak bond formation (5:10-24). Gore additionally teaches that the equilibrium temperature is preferably only slightly below the solidification temperature of the liquid-phase material for objects that are built up rapidly (6:42-45). Because Gore additionally teaches depositing tin (6:65), which melts at approximately 232

degrees C, it would have been obvious to one practicing the combined method that in order to deposit tin, a build chamber temperature greater than 200 degrees C would be needed in order to provide an equilibrium temperature only slightly below the solidification temperature in order to maximize the build speed (6:42-45). Additionally, Gore teaches (5:10-24) that the temperature of the layered materials, and therefore the chamber that contains them, represents a result-effective variable that can be optimized. See MPEP 2144.05 II and *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). **As to Claim 11,** Penn provides all components moved in all directions (6:54-68). **As to Claim 12,** Penn provides a modeling feedstock to an inlet located external to the build chamber (see tubes coming out of item 40 in Fig. 1a).

As to Claim 14, Penn teaches a method for three-dimensional modeling (entire document) comprising the steps of heating a build chamber to an elevated temperature (7:50-55), dispensing modeling material from an outlet of a dispensing head onto a base, and moving the dispensing head and the base in three-dimensions with respect to one another in synchrony with the dispensing of modeling material so as to build up a three dimensional object of predetermined shape on the base (6:54-68, 8:35-46):

Wherein the motion of the dispensing head and the base are controlled by motion control components (Item 45 in Fig. 1a), the motion control components being located external to and in thermal isolation from the build chamber by at least a first deformable thermal insulator and a second deformable thermal insulator, wherein the first deformable thermal insulator is compressed or expanded when the dispensing head is moved in a first direction and wherein the second deformable thermal insulator is compressed or expanded when the dispensing head is

moved in a second direction that is orthogonal to the first direction (compressible thermal insulators are present by each of the arrows in Fig. 1a).

Penn appears to be silent to a base provided in the build chamber. However, Gore teaches a base provided "in" the build chamber (Fig. 1, items 28 and 22). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Gore into that of Penn because (1) Penn suggests an environmentally-controlled chamber and Gore provides such a chamber, and (2) Gore teaches that the mass of the substrate is important and should be monitored to provide optimum solidification (6:7-20).

As to Claims 15 and 16, Gore teaches that either the layered material or the lower bead can be heated and controlled within well-defined temperature ranges to avoid weak bond formation (5:10-24). Gore additionally teaches that the equilibrium temperature is preferably only slightly below the solidification temperature of the liquid-phase material for objects that are built up rapidly (6:42-45). Because Gore additionally teaches depositing tin (6:65), which melts at approximately 232 degrees C, it would have been obvious to one practicing the combined method that in order to deposit tin, a build chamber temperature greater than 200 degrees C would be needed in order to provide an equilibrium temperature only slightly below the solidification temperature in order to maximize the build speed (6:42-45). Additionally, Gore teaches (5:10-24) that the temperature of the layered materials, and therefore the chamber that contains them, represents a result-effective variable that can be optimized. See MPEP 2144.05 II and *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). **As to Claim 17**, Penn provides all components moved in all directions (6:54-68). **As to Claim 18**, Penn provides a modeling feedstock to an inlet located external to the build chamber (see tubes coming out of item 40 in

Fig. 1a). **As to Claim 20**, Penn's deformable thermal insulators are interpreted to be baffles (Fig. 1a).

4. **Claims 7 and 13** are rejected under 35 U.S.C. 103(a) as obvious over Penn (USPN 5260009) in view of Gore (USPN 5257657) and further in view of Reiss (USPN 5581994), and Beeston (USPN 3472452). Penn and Gore teach the subject matter of Claims 1 and 8 above under 35 USC 103(a). **As to Claims 7 and 13**, Penn is silent to (a) heating by convection, (b) creating an air flow, and (c) deflecting air in the flow pattern towards the dispensing head outlet.. However, Beeston teaches (a) a chamber heated by convection (b) such that an air flow pattern is created in the chamber (Fig. 1, arrows 72 and 70). Reiss teaches a method for cooling a thermally loaded component by (c) deflecting an air flow pattern towards the thermally loaded component (1:5-17). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the methods of Reiss and Beeston into that of Penn in order to (1) provide a constant temperature inside an enclosure while the outside temperature varies at random (Beeston 1:26-30), and (2) cool the thermally loaded component by deflecting an air flow pattern towards the thermally loaded component (Reiss 1:5-17).

5. **Claim 19** is rejected under 35 U.S.C. 103(a) as obvious over Penn (USPN 5260009) in view of Gore (USPN 5257657) and further in view of Caugherty (USPN 2117651). Penn and Gore teach the subject matter of Claim 14 above under 35 USC 103(a). **As to Claim 19**, Penn and Gore appear to be silent to the claimed removing a buildup by driving the head against a rotating member. However, this limitation would have been prima facie obvious over

Caugherty, who teaches removing a buildup of material from a cylindrical rod by driving the cylindrical rod against a rotating member of a cleaning assembly (Fig. 2). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Caugherty into that of Penn because Penn clearly suggests a purge and wipe station (9:15-20) which Caugherty provides.

Response to Arguments

6. Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J. Daniels whose telephone number is (571) 272-2450. The examiner can normally be reached on Monday - Friday, 8:00 am - 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on (571) 272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MJD 12/20/06

/MJD/

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SUPERVISORY PATENT EXAMINER
1/4/07